CASE HISTORY
CH-SSP008-ZA-MR348 Morrison Road-Rev00-Jun17

MR348 – MORRISON ROAD
GLENTANA - WESTERN CAPE, SOUTH AFRICA

ROAD PAVEMENTS - Sub-base reinforcement

Product: Macgrid® EG 30S

Problem
The investigation of the road revealed that major a deep seated deformation/settlement had taken place over certain sections of the road. A geotechnical investigation using Dynamic Probe Super Heavy (DPSH) testing indicated the presence of a deep (up to 8m in certain locations), soft, low strength subgrade SPT. “N” values as low as 1 were recorded in certain locations due to penetration generally occurring under self-weight of the equipment with no drop weight activation required, indicating a very poor subgrade.

From test pits, the subgrade material was classified as sand containing organic decomposed material. Various pavement rehabilitation options were investigated during the design stage of the project. This included amongst others the removal and replacing of the poor subgrade material. This option was found to be unpractical considering the depth of the poor subgrade and the restrictive environment of the road. Other options investigated included the use of micro piling but, due to the high cost, this option was also not considered to be viable. The rehabilitation strategy that was found to be the most cost effective was ground stabilization technique using geosynthetics in order to reduce the overburden pressure caused by the increase in pavement thickness.

Solution
One of the main design criteria was to maintain an undisturbed stress state in the soft, poor subgrade material to avoid deformation and resultant failure.

Traditional design run using the South African Mechanistic Pavement Design Method - SAMPDM considering a road Category B as per TRH 4 with an ES3 (3 million ESAL) resulted in a total pavement depth of 1.2m.

The results from the model are shown in Figure 9 where two geogrids (Table 2) were placed, one in the G7 and one in the G4 base, reducing the excavation from 1.2m to 0.7m. This achieved a no-stress variance in the soft layer (which would have failed due to the overburden pressure caused by the extra layer thickness), as well as maintaining the same road surface level, which was paramount due to the main intersections and road annexures.

Client:
PROVINCIAL GOVERNMENT OF THE WESTERN CAPE

Main contractor:
BASELINE CIVIL CONTRACTORS

Designer:
KANTEY & TEMPLER CONSULTING ENGINEERS

Products used:
MACGRID® EG 30S - 30,000M²

Date of construction
Mar 2014 - Oct 2015
Construction

Construction commenced in March 2014. Storm water reticulation along the edges of the road prism was upgraded before proceeding with the layerworks. Due to traffic constraints the contractor was only allowed to work half widths. The contractor requested access to the full width of the road to reduce the construction time. The request was accepted by the client and traffic was redirected through the surrounding municipal areas. By constructing in full width, the contractor was able to lay down the geogrid in one operation minimizing jointing and effectively only using 3 roll widths to cover the road prism. The first geogrid layer was placed on the road box cut and then covered with a G7 subgrade. Particular attention was given to jointing of the geogrid. A minimum overlap of 300mm was required to ensure the tensile forces in the geogrids would be transmitted through the layer works.

Project Integration

Maccaferri provided design, supply and professional indemnity for the design of the ground stabilization as per our internal Level 3 projects.